ascertained to yield one fifth part of alcohol by distillation. When the same experiment was repeated on the same wine, to which one seventh part of alcohol had been previously added, still none was separated by subcarbonate of potash: but when so much as one third part had been added, then a very small proportion was found to float upon the surface after it had stood twenty-four hours.

When madeira or sherry were employed instead of port, the results were nearly the same. Since the method of Fabroni failed of detecting the presence of alcohol, unless the quantity was very considerable, it became necessary to have recourse to some other method of proving or disproving the presence of it as a product of fermentation; and Mr. Brande conceived, that if it were formed by the heat applied in distillation, the quantity should in that case be different when the same liquor was distilled at different temperatures.

In the first of four processes of distillation, port wine was made to acquire the heat of 200° by addition of muriate of lime, and one half was quickly distilled over; and in the last, an equal quantity of port was kept for five days at the temperature of 180°, till half the quantity had passed over into the receiver; but in all these experiments the specific gravities of the products were so nearly the same, that there did not appear to be any difference in the quantity of alcohol obtained.

Mr. Brande also attempted to separate alcohol from different kinds of wine by freezing; but the cake of ice produced was spongy, and would not allow any portion of alcohol to separate from it.

The author having thus, to his satisfaction, proved the existence of alcohol ready formed in fermented liquors, undertook, in the next place, to ascertain the relative strength of different kinds of wine; and he concludes the present communication with a Table, in which is expressed the proportion per cent. of alcohol contained in a given measure of the several liquors that he has examined.

In this table the alcohol obtained from Port varies from 21 to nearly 26 per cent.; Madeira 19 to 24; Sherry not so much as 20 per cent.; Claret from 13 to 16; Lisbon 19; Marsala nearly 26; Champagne from 11 to 13; Burgundy 12 to 14; Hock 9 to 14; Raisin wine $25\frac{3}{4}$; Currant wine $20\frac{1}{2}$; Cider and Perry nearly 10; Ale nearly 9 per cent.; good rum and brandy containing 53 per cent. of alcohol at the same standard of ·825 specific gravity.

Account of a Lithological Survey of Schehallien, made in order to determine the specific Gravity of the Rocks which compose that Mountain. By John Playfair, *Esq. F.R.S.* Read June 27, 1811. [*Phil. Trans.* 1811, *p.* 347.]

Norwithstanding the skill with which Dr. Maskelyne conducted the astronomical observations upon Schehallien, and the accuracy with which he may be presumed to have measured the deflection of his plumb-line from the perpendicular, whereby he discovered the actual attraction of that mountain; and although great ingenuity

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was manifested by Dr. Hutton in deducing from thence the mean density of the earth; there remained one source of uncertainty in their results, dependent on the specific gravity of the mountain, which they assumed to be 2·5, but were aware that this might not be so accurate as would be desirable in a standard to which the density of the earth is directly compared.

It was for this purpose that Mr. Playfair, with the assistance of Lord Webb Seymour, undertook the present survey of Schehallien, ascertaining, as accurately as they were able, the direction and inclination of the strata of which the mountain consists, and collecting specimens of all the varieties of rock which they could discover, in order to determine the specific gravity of each by direct experiment, and thence to estimate the correction which it might be necessary to introduce into Dr. Hutton's calculation.

Schehallien, like all other mountains in its vicinity, was found to consist entirely of primitive rocks in strata, which stretch in a direction from S.E. to N.W., and nearly vertical in position; but in some parts towards the base, they deviate as much as 15° from the perpendicular. The most elevated and by far the largest part of the mountain was found to consist of granular quartz, extremely hard, compact, and homogeneous, of which the specific gravity, by an average of thirteen specimens, was nearly 2·64. Adjacent to this mass, on each side, and next in quantity, is a micaceous schist, containing hornblende; and lower down toward the base appear strata of granular limestone, highly crystallized, and containing mica. The specific gravity of this part of the mountain, on an average of fifteen specimens, was found to be 2·81.

Beside these there are also veins or dykes of porphyry and greenstone, which intersect the other strata at right angles, but bear a very small proportion to the general mass of the mountain.

With respect to the micaceous schist and limestone, which are distinctly stratified in vertical planes, their continuity from one extremity of the mountain to the other may with confidence be presumed; but this is not the case with respect to the granular quartz, which may either be interposed between them, and continue with them to an indefinite extent in length and depth, or may be of subsequent formation, occupying only the summit of the mountain, and not penetrating into the interior.

Since the result of the calculation of the earth's density is materially affected by the difference of these suppositions, the author has made an estimate according to each hypothesis.

With the exception of the corrections thus obtained for the specific gravity of the mountain, Mr. Playfair adopted the method employed by Dr. Hutton, of dividing the whole mass of the mountain into a certain number of vertical columns, formed by cylindrical sections, so that their respective attractions on the plumb-line could with great facility be computed upon the supposition of uniform density throughout.

Upon the former of the two hypotheses of Mr. Playfair, in which the granular quartz is supposed to pervade the base of the mountain to an indefinite depth, the corrections, in proportion to the mere difference between the specific gravities assumed by Dr. Hutton and that found by experiment, were simple in comparison to those necessary on the second hypothesis; but in each case the attractions of opposite portions of the cylindrical sections became, in fact, unequal, and consequently required to be computed with due regard to their respective specific gravities, as well as the azimuth and altitude of each.

The nature of these computations is fully explained by the author, but cannot be understood without reference to the figures which accompany them. The resulting density deduced according to the first hypothesis is found to be nearly 4·56; that deduced by Dr. Hutton having been only 4·48: but according to the second hypothesis, the difference is far more considerable; the density in this case being 4·87.

This last is nearly a mean between that of Dr. Hutton and the density of 5·48, which Mr. Cavendish inferred from a very different mode of investigation.

By considering the experiments on Schehallien alone, the density of the earth might be assumed to be between the limits above assigned, the mean of which amounts to 4·71. Mr. Playfair, however, thinks it desirable that an element so important in physical astronomy should be the result of many experiments, and recommends the selection of granite mountains, if possible, for this purpose, because their homogeneity might be presumed with considerable confidence.

Observations and Experiments on Vision. By William Charles Wells, *M.D. F.R.S.* Read July 4, 1811. [*Phil. Trans.* 1811, *p.* 378.]

The experiments here described by Dr. Wells were made in consequence of an imperfection of sight occurring to his observation, which he has nowhere seen upon record. The subject to whom the disorder happened was a gentleman about thirty-five years of age, who, after a slight catarrh, had been seized with a degree of stupor, and weight of his forehead, accompanied with a paralytic state of the right eyelid. The pupil of this eye was also observed to be much dilated; and he had lost all power of adapting that eye to near objects, although he could see at a distance with great distinctness. The left eye also became shortly after affected in a slight degree, and in a similar manner.

The nature of the defect became evident by trial of spectacles; for it was found that convex glasses enabled him to read with perfect ease, and supplied the want of the power of adaptation which he had before possessed.

Since the application of the juice of belladonna to the eye occasions a dilatation of the pupil, it appeared to Dr. Wells not improbable that it might also affect other muscular powers of the eye. It was his intention to have made this experiment on his own eyes;